

Army Regulation 70-47

Research, Development, and Acquisition

Engineering for Transportability

**Headquarters
Department of the Army
Washington, DC
19 August 1985**

UNCLASSIFIED

SUMMARY of CHANGE

AR 70-47

Engineering for Transportability

This regulation--

- o Updates AR 70-7 to reflect current policy, procedures, and organizations.
- o The major policy change requires MTMC Transportability Review before Milestones I and Transportability Approval before Milestones II and III.
- o The requirement to perform unit deployability studies is added to MTMC responsibilities.
- o The Commanding General, US Army Training and Doctrine Command is to furnish data for this effort.
- o This revision recognizes the importance of lighter, more deployable size units.

Effective 19 August 1985

Research, Development, and Acquisition

Engineering for Transportability

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

DONALD J. DELANDRO
Brigadier General, United States Army
The Adjutant General

History. This UPDATE printing publishes a revision, which is effective 19 August 1985. This publication has been reorganized to make it compatible with the Army electronic publishing database. No content has been changed.

Summary. This regulation directs the Army portion of the Department of Defense Engineering for Transportability Program set forth in AR 70-44/OPNAVINST 4600.22/

AFR 80-18/MCO 4610.14/DLAR 4500.25. This regulation also implements DODD 3224.1. This revision changes procedures, updates responsibilities, places greater emphasis on priorities, requires Transportability Approval before Milestone II (Full Scale Development Phase), and introduces unit deployability analyses.

Applicability. This regulation applies to the Active Army, U.S. Army Reserve, and Army National Guard. It applies to all Army product improvements, commercial items, foreign source, nondevelopment items, military adapted commercial items, rebuys, and research, development, test, and evaluation systems, equipment, and munitions, including components and spare parts.

Proponent and exception authority. Not applicable.

Impact on New Manning System. This regulation does not contain information that affects the New Manning System.

Army management control process. Not applicable.

Supplementation. Supplementation of this

regulation is prohibited without prior approval from Commander, Military Traffic Management Command, ATTN: MT-SA, Falls Church, VA 22041-5050.

Interim changes. Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

Suggested Improvements. The proponent agency of this regulation is the Office of the Deputy Chief of Staff for Logistics. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, MTMC, ATTN: MT-SA, Falls Church, VA 22041-5050.

Distribution. Active Army, ARNG, and USAR: D.

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*This regulation supersedes AR 70-47, 28 January 1976.

RESERVED

Chapter 1 Introduction

1-1. Purpose

This regulation provides policy, assigns responsibilities, and prescribes procedures for the Army Engineering for Transportability Program as set forth in AR 70-44. It provides Army materiel and combat developer guidance and procedures for use during the materiel acquisition process. These procedures assure that systems, equipment, and munitions (SEM) including components and spare parts are designed, engineered, and constructed so that required quantities can be moved efficiently by existing and planned transportation assets.

1-2. References

Required and related publications and a referenced form are listed in appendix A.

1-3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

1-4. Responsibilities

a. The Assistant Secretary of the Army (Installations and Logistics), in coordination with the Assistant Secretary of the Army (Research, Development, and Acquisition), provides policy guidance for the Engineering for Transportability Program.

b. The Deputy Chief of Staff for Logistics (DCSLOG) has Army General staff responsibilities for the Army Engineering for Transportability Program.

c. The Deputy Chief of Staff for Research, Development, and Acquisition will ensure adequate consideration of transportability during research, development, test, and evaluation (RDTE) of acquired materiel systems.

d. The Deputy Chief of Staff for Operations and Plans will assure that materiel requirements documents consider transportability before approval.

e. The Commander, Military Traffic Management Command (MTMC), as the Army Transportability Agent (AR 70-44), discharges the responsibilities of the Secretary of the Army. The Commander, MTMC will—

(1) Provide all transportability approvals to Army developing and procuring agencies and provide land transportability approvals to the other Department of Defense (DOD) components.

(2) Participate in Army Systems Acquisition Review Council (ASARC) and in-process reviews (IPR) when the systems are considered transportability problem items (AR 70-44, app A, para A-9). Provide advice to the DCSLOG on transportability considerations and problems of ASARC reviews (AR 70-1).

(3) Approve test loading requests.

f. The Commander, MTMC Transportation Engineering Agency (MTMCTEA) will—

(1) Serve as the single point of contact for Army agencies in securing transportability engineering analysis and assistance, test loadings and transportability approvals from the other Services.

(2) Conduct transportability engineering analyses for each item for which a transportability report or Logistical Support Analysis Record (LSAR) "J" (MIL-STD 1388-2A Logistic Support Analysis Record) is submitted.

(3) Conduct unit deployability studies.

(4) Review Justification of Major System New Starts (JMSNS), Operational and Organizational (O&O) Plans, Letter of Agreement (LOA), Letter Requirement (LR), Required Operational Capability (ROC), Joint Services Operational Requirement (JSOR), specifications, and other requirements documents. The review will assure that the transportability and transportation requirements are sufficiently addressed for systems to meet their mission and deployment requirements (AR 71-9). The review will also help the commander advise developers.

(5) Provide transportability assistance to special task force, special study group or ad hoc group assembled for system acquisition in accordance with AR 71-9.

(6) Review transportability sections of Test and Evaluation Master Plan (TEMP) and Materiel Fielding Plans.

(7) Prepare or approve transportability guidance technical manuals (TGTMs).

(8) Provide guidelines and uniform specifications for contractor preparation of transportability reports and TGTMs.

(9) Validate requirements of special assignment airlift missions (SAAM) required for air transportability test loadings.

(10) Provide Department of Defense (DOD) representation on the Association of American Railroads' Open Top Car Loading Rules Committee.

(11) Provide transportability engineering assistance and service to Army commands and agencies and to other DOD components.

(12) Manage data collection and data input in the Department of Army Standard Equipment Transportability Characteristics file.

(13) In coordination with the U.S. Air Force, maintain and publish current listing of Army, Air Force, and Marine Corps equipment certified for transport in the U.S. Air Force Military Airlift Command (MAC) and Civil Reserve Air Fleet (CRAF) aircraft.

g. Materiel developers (MATDEV) are responsible for ensuring that materiel systems are designed, engineered, and constructed in accordance with the requirements of the Army Engineering for Transportability Program (AR 70-44). To accomplish this the MATDEV will—

(1) Establish transportability engineering focal points.

(2) Submit transportability report or LSAR "J" and request transportability analysis and approval from MTMC in accordance with AR 70-1.

(3) Conduct development tests of new or improved materiel to assure compliance with stated transportability requirements and to identify deficiencies.

(4) Monitor transportability problem items (see glossary) until deficiencies are corrected and MTMC issues transportability approval.

(5) Determine, in coordination with the combat developers and MTMCTEA, the need for a TGTMs on problem items and document in the Integrated Logistics Support Plan (ILSP).

(6) Provide for preparation of transportability reports and TGTMs for materiel being developed under the system and project management concept (AR 70-17).

(7) Request Army transportability agent representative at IPRs for materiel systems that are transportability problem items.

(8) Incorporate transportability testing in the TEMP in coordination with the combat developer, operational tester, logistician trainer, and MTMCTEA.

(9) Provide logistic support analysis data (AR 700-127) related to transportability and transportation to MTMCTEA for update of the Department of the Army (DA) master file of standard equipment characteristics.

h. The Commanding General (CG), U.S. Army Materiel Command (AMC) is responsible in assigned areas for RDTE, acquisition, and logistic support of materiel systems required by the Army. The CG, AMC will—

(1) Develop a command awareness of the Army Engineering for Transportability Program.

(2) Conduct the Army's research and development program for air transportable materiel and materiel deliverable by airdrop.

(3) Determine, in cooperation with the Air Force and the U.S. Army Training and Doctrine Command (TRADOC), detailed rigging procedures to be used by the Army for airdrop of materiel and conducting development tests of ancillary airdrop equipment to demonstrate the degree to which the materiel and ancillary equipment meets the airdrop requirements.

(4) Determine, in cooperation with the Air Force and TRADOC, procedures for disassembling, loading, restraining, and offloading for internal air transport of materiel and conduct development tests to demonstrate the degree to which the procedures meet the internal air transport requirements.

(5) Develop the trial rigging equipment procedures and instructions for internal or external Army helicopter air transport and conduct development tests to demonstrate the degree to which the requirement has been met.

(6) Develop blocking, bracing, slinging, lifting, and tiedown procedures to assure safe, economical, logistical, and tactical transport.

(7) Conduct development tests of materiel for containerization and for transport by amphibians and landing craft.

(8) Develop and obtain approval for outloading drawings for ammunition commodities and missile and rocket ground support equipment.

(9) Provide land transportability testing when requested by other DOD transportability agents.

(10) Assist MTMCTEA in the collection of transportability characteristics data for Army end items of equipment (AR 310-31).

(11) Furnish MTMCTEA the transportability characteristics data for all items of equipment under AMC management.

(12) Notify MTMCTEA of changes in equipment dimensions or weight resulting from product improvement programs (PIP).

(13) When considering procurement of commercial materiel systems to meet Army needs in the field, determine whether modification is necessary to meet transportability requirements, including those necessary for logistics-over-the-shore (LOTS) and airborne operations.

i. The Director, AMC Packaging, Storage, and Containerization Center will—

(1) Serve as AMC focal point for the transportability packaging program.

(2) Coordinate with AMC major subordinate commands to provide transportability characteristics data to MTMCTEA.

(3) Coordinate with MTMCTEA, as required, in connection with nonengineering aspects of the DA Transportability Program.

j. The Commander, U.S. Army Natick Research and Development Center (USANRDC) will—

(1) Provide engineering and design assistance for materiel to be air transported/airdropped from fixed winged aircraft, and internally/externally transported by Army rotary winged aircraft.

(2) Issue official certifications for materiel to be airdropped from fixed winged aircraft, and internally/externally transported by Army rotary winged aircraft.

k. The Commanding General, TRADOC will—

(1) Ensure that strategic and tactical transportability requirements (including modal requirements) are adequately stated in materiel requirements documents and coordinate documents with MTMCTEA and U.S. Army Logistics Evaluation Agency (USALEA).

(2) Validate essential transportability requirements to assure that they are in accord with appropriate doctrine.

(3) Establish transportability engineering focal points to assist the command, the Army transportability agent, and MTMCTEA.

(4) Ensure the completion of an initial transportability assessment of SEM under development/change during concept development.

(5) Provide tentative basis of issue plan (TBOIP) and basis of issue plan (BOIP) data on selected systems to MTMCTEA for conduct of unit deployability studies.

(6) Conduct operational aerial delivery testing to include low velocity airdrop (LVAD), low attitude parachute extraction (LAPE), internal air transport (IAT) and external air transport (EAT) for validation of trial procedures.

(7) Publish transport procedures and prepare adequate training courses and material.

(8) Prepare, coordinate, and submit for publication, training literature on transport procedures for tactical unit movement of organic unit materiel (AR 310-3).

(9) Publish approved rigging procedures for airdrop and air transport (except nuclear).

l. The Commander, USALEA will coordinate with MTMCTEA to assure that transportability of SEM is adequately considered when establishing the logistician's IPR position and that transportability approvals are obtained.

m. The Director, U.S. Army Defense Ammunition Center and School will coordinate with MTMCTEA and publish outloading and unitization drawings for ammunition and rocket/missile ground support equipment (AR 740-1).

n. The Commander, U.S. Army Operational Test and Evaluation Agency is responsible for managing the Army's continuous comprehensive evaluation and user testing programs.

Chapter 2

Transportability Engineering in the Acquisition Process

2-1. Policies

The following statements supplement those in AR 70-44:

a. The concept of developing efficiently transportable equipment and combat resources will be an integral part of the acquisition process.

b. Transportability is a critical element of strategic and tactical deployment. When strategic and tactical deployment is a system requirement, transportability will be a primary system selection and design factor. Tradeoffs between transportability and combat effectiveness may be appropriate.

c. Developers of new weapons and equipment will consider the special operating characteristics of light infantry.

d. Combat and materiel developers will maintain an active relationship with the Army transportability agent to assure adequate consideration in all phases of development.

e. The required type of transportability (worldwide road, rail, air, water) together with any special requirements for light infantry, airdrop, and tactical transport will be explicitly stated in the requirements document's, purchase descriptions, and in the item specifications. The Army transportability agent will review requirements documents for systems classified as problem items.

f. The Army transportability agent will keep the other DOD transportability agents informed of Army needs that are major factors in design of transportation systems under the DOD agents' control.

g. SEM with an air transport requirement will be designed for transport in at least two types of MAC aircraft. SEM limited to C-5 aircraft require approval by appropriate HQDA staff elements.

h. SEM will meet State and Federal legal and operational standards for the design and use of public highways.

i. SEMs will be designed (or procured) to carry their rated payload during all of their required transport modes (worldwide road, rail, air, water).

2-2. Coordination and guidelines

a. General.

(1) TRADOC and AMC will refer all transportability matters to MTMC. MTMC is the single DOD manager for military traffic, surface transportation, and common ocean terminals. MTMC will grant transportability approval for all modes of transportation.

(2) Combat developers (CBTDEV), MATDEVs, testers, logisticians, and users will maintain a liaison with MTMC and each other to assure consideration and accomplishment of transportability requirements.

(a) Correspondence concerning transportability policy, regulations, and requests for test loadings, will be forwarded to the Commander, MTMC, ATTN: MT-SA, Falls Church, VA 22041-5050.

(b) Correspondence concerning transportability reports, requests for transportability approvals, and technical and operational matters pertaining to the day-to-day operations of the engineering for transportability program including requests for approval of loading drawings for inclusion to the Association of American Railroads (AAR) "Rules Governing the Loading of Commodities on Open Top Cars" will be forwarded to Commander, MTMCTEA, ATTN: MTT-TR, Newport News, VA 23606-0276.

(3) CBTDEVs and MATDEVs will obtain transportability engineering and design assistance from MTMCTEA for materiel to be

transported in Air Force aircraft. MTMCTEA will obtain air certification from the U.S. Air Force Aeronautical Systems Division (ASD/ENECA) per AR 70-44, appendix B.

(4) CBTDEVs and MATDEVs will obtain engineering and design assistance from the Commander, USANRDC, ATTN: STRNC-UAS, Natick, MA 01760-5000, for certification of material to be airdropped (MIL-STD-814 and MIL-STD-669)—

(a) From fixed wing aircraft; or

(b) Internally or externally transported by U.S. Army rotary winged aircraft.

(5) USANRDC will provide airdrop and helicopter certifications to MTMCTEA.

(6) MIL-HDBK-157, MIL-STD-1366, MIL-STD-1367, and MIL-A-8421 will be used for transportability criteria. MIL-STD-209 will be used for slinging and tiedown criteria. MIL-STD-669 and MIL-STD-814 will be used for airdrop criteria.

(7) SEM will have a transportability data plate or decal which will show tiedown and lifting points, locations, and strengths, and the location of the center of gravity (MIL-STD-1388).

(8) The Army transportability agent will convene meetings of Army transportability engineering focal points and arrange for working groups to resolve problems and recommend policy objectives when necessary.

b. Materiel requirements documents.

(1) Tactical and strategic mobility requirements must be established early in the acquisition cycle and monitored throughout. The CBTDEVs in coordination with the MATDEVs and MTMCTEA will include a clear and definite statement of the required modes of transport in the materiel requirement documents.

(a) For strategic transport, SEMs will be transportable by highways, standard gauge railway, ocean shipping, and U.S. Air Force aircraft. U.S. Army aircraft will not be considered transportable by rail.

(b) For tactical transport, SEM transportability requirements (airlift, airdrop by LAPE, LVAD, and high velocity airdrop (HVAD); LOTS; and external or internal transport by rotary winged aircraft) will be commensurate with the tactical deployability requirements of the units.

(c) SEM with air transportability limited to the C-5 aircraft will be reserved only for those items that cannot be dimensionally and weight reduced within 1 hour to accommodate C-130 and C-141.

(d) Cargo vehicles will be capable of being transported with rated payload by rail, water, and U.S. Air Force aircraft.

(2) The following are presented to assist in development of transportability requirement statements:

(a) *Highway.* If the item is to be transported or towed, the types and models of the planned transport vehicle will be stated.

(b) *Rail.* State requirement for rail transportability in the continental United States (CONUS) and overseas. Include requirement for transport by specific types of rail equipment.

(c) *Water.* State any specific environmental or protective measures required.

(d) *Lighters.* State and define the smallest lighter that is required to transport the item in LOTS operations.

(e) *Military cargo aircraft (fixed wing).* State the types required (C-130, C-141, or C-5) and whether airdrop (LAPE, HVAD) is required. If sectionalization is permitted, state the permissible number of people and the assembly and disassembly clock hours.

(f) *Helicopters.* Specify the types of helicopters required (CH-46, CH-47, CH-53, CH-54, UH-1, UH-60A) and whether internal or external airlift is required. Specify scenario and mission range.

(g) *Intermodal freight containers.* List the sizes (10, 20, 25, 30, 35, 40, or 45 ft) and the International Standards Organization (ISO) designation of containers in which transport is required. Normally, nonvehicular SEMs and small vehicles will be containerized.

c. Transportability reports.

(1) MATDEVs must submit transportability data to MTMCTEA. The data may be submitted in the transportability report format (app B) or LSAR "J". For brevity, this regulation will refer to the transportability report.

(2) MATDEVs will submit transportability reports (see app B for format) on all transportability problem items and systems with stated transportability requirements to CDR MTMCTEA (ATTN: MTT-TR), Newport News, VA 23606-0276.

(a) The initial transportability report will be submitted by the MATDEV as soon as the item's general configuration is established during the Concept Exploration Phase. In all cases the initial transportability report will be submitted not later than 90 days before the Milestone I decision review. MTMCTEA will then perform a transportability engineering assessment of the proposed item and provide analysis results to the MATDEV.

(b) An updated transportability report and a request for transportability approval will be submitted by the MATDEV not later than 90 days prior to the Milestone II decision review. If the item or system meets transportability requirements, MTMC will grant transportability approval. (See fig 2-1.)

(c) An updated transportability report will be submitted by the MATDEV no later than 90 days prior to Milestone III decision review for RDTE items. For nondevelopmental items (NDI) or systems, the functional purchase description (or specification) must be submitted 30 days prior to Milestone III decision review. (See fig 2-2.) A transportability report must be submitted not later than 30 days prior to awarding a production contract. If the item or system meets the transportability requirements established by the requirement document, MTMC will formally reaffirm Milestone II transportability approval for RDTE items or grant transportability approval for NDIs or systems. (App C is a checklist of transportability actions.)

(d) Field units or MATDEVs will submit a transportability report and request for transportability approval whenever there is an increase in an item's or system's shipping dimensions or weight due to product improvements or field modifications.

(e) Transportability reports, MTMCTEA's transportability engineering analysis, and transportability approvals will be included in the integrated logistics support (ILS) portion of the program management documents.

d. Unit deployment analyses.

(1) Proposed SEMs that have a strategic deployment requirement will have a unit deployment assessment conducted by MTMCTEA for consideration during concept development. MTMCTEA and the CBTDEVs will review proposed SEMs and determine the need for such assessments.

(2) Proposed SEMs having a unit deployment assessment will also have a unit deployment analysis conducted and furnished to the logistic representative before Milestone II decision reviews. The analysis will include the end item and all identified support equipment.

e. Airdrop and air transport.

(1) Design assistance available from USANRDC include the following:

(a) Analysis of proposed designs to determine air transport and airdrop acceptability. This assistance will be obtained as early as possible in the design stages of development.

(b) Engineer designed trial rigging procedures for air transport or airdrop of the final design of developmental materiel.

(c) Laboratory facilities for development testing of proposed materiel in controlled air transport and airdrop environment including lifting provision and tiedown provision restraint test facilities. In addition, static drop, roller testing, and extraction provision testing would be included for materiel to be delivered by parachute.

(d) Recommendations for component and systems designs and energy dissipation configurations to provide optimum airdrop capability.

(1) When equipment is developed for airdrop, auxiliary equipment such as platform, parachute, webbing strap, and energy dissipation materiel (MIL-STD-669) must be considered. The unit (rigged) load will meet the limitations specified in MIL-A-8421. Tiedown, suspension, and extraction provisions will meet the requirements of MIL-STD 814. Equipment designed for airdrop must also be designed to be air transportable.

(2) SEMs to be transported internally or externally by Army

helicopters (CH-47, CH-54, UH-1, and UH-60) require transportability approval of MTMC. The MATDEVs will submit test data or structural analyses to MTMCTEA and USANRDC that prove lifting and tiedown points meet MIL-STD-209. Test loadings may be required if the transportability engineering analysis indicates that transport criteria are violated. Certification by the USANRDC is required for transportability approval.

f. Transportability testing.

(3) When an air transportability test loading is required, the MATDEVs will submit DD Form 2083 (Request for Transportability Loading/Analysis) (in accordance with the procedures in AR 70-44, app B). At the same time the materiel developer will request an SAAM or a test loading through the Joint Airborne/Air Transportability Training program. This request will be forwarded through the Commander, MTMC, ATTN: MT-SA, Falls Church, VA 22041-5050, in accordance with the provisions of AR 59-9.

(2) MATDEVs and CBTDEVs will not establish new test facilities to conduct airdrop tests on materiel. Such test facilities are established and maintained by the Test and Evaluation Command (TECOM) and TRADOC. This does not prevent the use of development agencies' static drop facilities that are already in existence and maintained for other developmental purpose.

g. TGTMs.

(1) TGTMs depict transportability characteristics along with item preparation, loading, securing, and unloading procedures for shipment of the item by all appropriate modes of transportation. TGTMs are required for transportability problem items except for those items where the MATDEVs, the CBTDEVs, and MTMCTEA agree that there is no requirement. TGT requirements will be documented in the ILSP and are the materiel developers' responsibility. TGTMs will be in accordance with MIL-M-63023 and will be approved by MTMCTEA before publication. TGTMs for U.S. Army aircraft known as "Preparation for Shipment Manuals" will be prepared in accordance with MIL-M-63005(AV) and approved by MTMCTEA before publication. Considerations in evaluating the requirement for a TGT are—

(a) Applicability of guidance for similar items of SEMs.

(b) Adequacy of other published or planned guidance (e.g., TRADOC training literature, clearance diagrams, AAR loading rules, U.S. Army Defense Ammunition Center and school loading drawings, and U.S. Air Force Technical Orders).

(c) Number of items to be procured.

(d) Complexity of loading and securement procedures.

(2) Transportability clearance diagrams are the MATDEVs responsibility and consist of end and side profile drawings showing critical dimensions, weight, and other technical data. MATDEVs will provide for clearance diagrams and submit diagrams to Commander, MTMCTEA, ATTN: MTT-TR, Newport News, VA 23606-0276. MTMCTEA will publish diagrams in TB 55-55.

h. Transportability characteristic data. MATDEVs will submit transportability characteristics data to Commander, MTMCTEA, ATTN: MMT-OA, Newport News, VA 23606-0276, within 30 days of an item being assigned to a table of organization and equipment (TOE) or being assigned a standard line item number. (See AR 310-31.) For items where MTMC has conducted a transportability engineering analysis and granted transportability approval, the developer will either certify that the data submitted during RDTE are valid for the production model or submit corrected data on the item line.

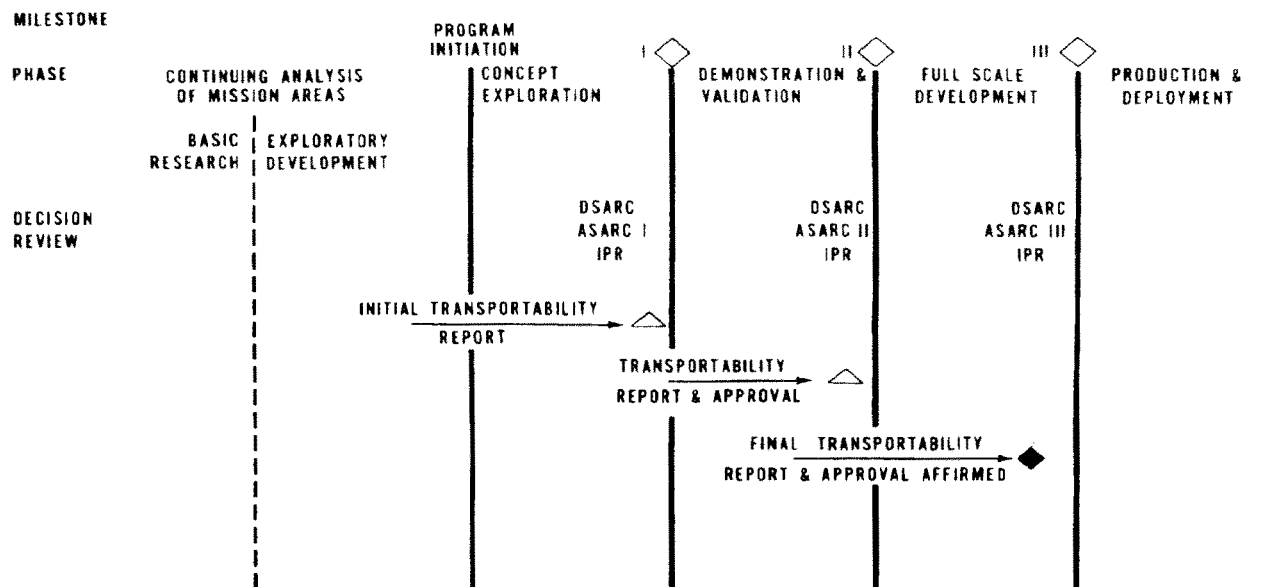


Figure 2-1. Research, development, test, and evaluation (RDTE)

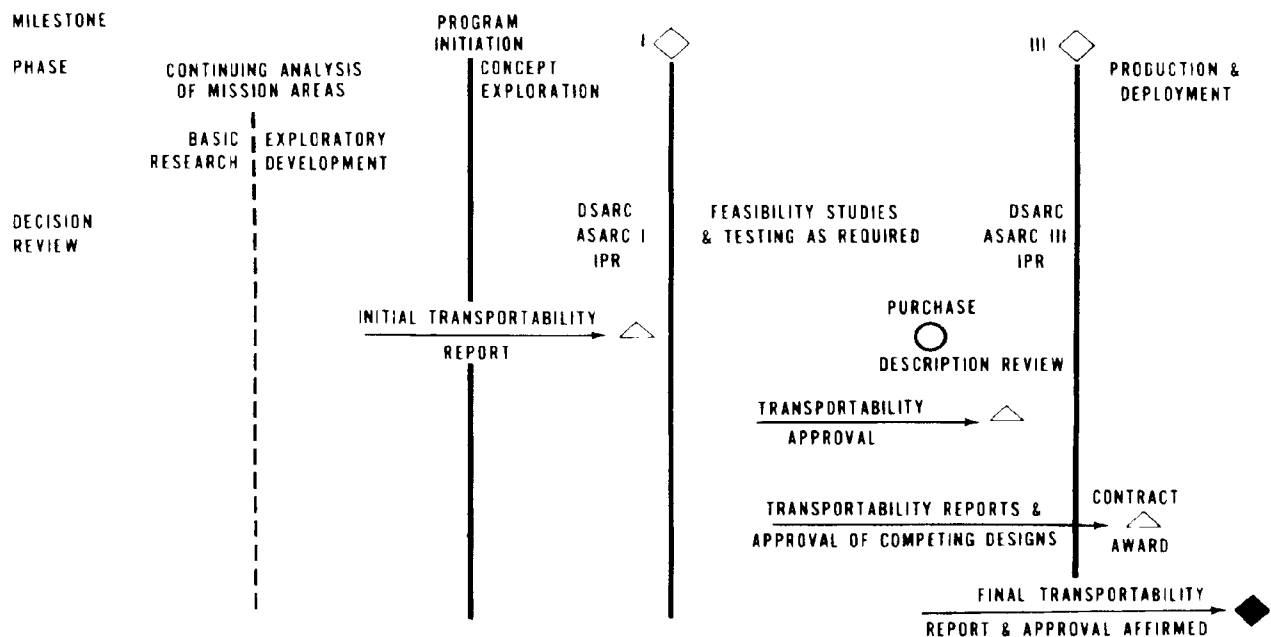


Figure 2-2. Nondevelopmental item (NDI)

Appendix A References

Section I Required Publications

AR 59-9

Special Assignment Airlift Mission Requirements Submission Procedures. (Cited in para 2-2.)

AR 70-1

Systems Acquisition Policy and Procedures. (Cited in para 1-4.)

AR 70-44

DOD Engineering for Transportability. (Cited in in paras 1-1, 1-4, and 2-2.)

AR 71-9

Materiel Objectives and Requirements. (Cited in para 1-4.)

AR 310-3

Preparation, Coordination, and Approval of Department of the Army Publications. (Cited in para 1-4.)

AR 310-31

Management System for Tables of Organization and Equipment(The TOE System). (Cited in paras 1-4 and 2-2.)

AR 700-127

Integrated Logistic Support (ILS). (Cited in para 1-4.)

AR 740-1

Storage and Supply Activity Operations. (Cited in para 1-4.)

MIL-HDBK-157

Transportability Criteria. (Cited in para 2-2.)

MIL-A-8421

Air Transportability Requirements, General Specification For. (Cited in para 2-2.)

MIL-M-63005

(AV) Manual Technical: Preparation for Shipment of Army Aircraft.(Cited in para 2-2.)

MIL-M-63023

Manual, Technical. Transportability Guidance for Military Materiel, Preparation of. (Cited in para 2-2.)

MIL-STD-209

Slings and Tiedown Provisions for Lifting and Tying Down Military Equipment. (Cited in para 2-2.)

MIL-STD-669

Loading Environment and Related Requirements for Platform Rigged Airdrop Materiel. (Cited in para 2-2.)

MIL-STD-814

Requirement for Tiedown, Suspension and Extraction Provisions on Military Materiel for Airdrop. (Cited in para 2-2.)

MIL-STD-1366

Materiel Transportation System Dimensional and Weight Constraints, Definition of. (Cited in para 2-2.)

MIL-STD-1367

Packaging, Handling and Transportability Required for Systems and Equipment. (Cited in para 2-2.)

MIL-STD-1388-1A and 2A

Logistic Support Analysis Record. (Cited in paras 1-4 and 2-2.)

TB 55-55

Technical Bulletin: Transportability Clearance Diagrams for U.S. Army Outsized Equipment: Unboxed Prepared for Shipment. (Cited in para 2-2.)

Section II Related Publications

AR 56-1

Use on Intermodal Containers, Special Purpose Vans, and Tactical Shelters.

AR 70-10

Test and Evaluation During Development and Acquisition of Materiel.

AR 70-17

System/Program/Project/Product Management.

AR 71-3

User Testing

AR 700-9

Policies of the Army Logistics System.

AR 1000-1

Basic Policies for System Acquisition.

DODD 3224.1

Engineering for Transportability.

DOD 5000.1

Major Systems Acquisition Procedures.

DODI 5000.2

Major System Acquisition Procedures.

DODD 5000.39

Acquisition and Management of Integrated Logistic Support for Systems and Equipment.

Section III Referenced Forms

DD Form 2083

Request for Transportability Loading/Analysis

Section IV Referenced Forms

This section contains no entries.

Appendix B Format For Transportability Report

1. *Official nomenclature.*

2. *Brief description.*

a. Intended use.

b. Type acquisition. For example, developmental (RDTE); non-developmental item (NDI); product improvement program (PIP); commercial construction equipment (CCE); rebuys; or foreign source.

c. Type of Unit(s). TOE numbers that will use or transport the item.

d. Theater(s) of Operations. List in priority order.

3. *Transportability requirements.*

a. Documents.

(1) Send copy of JMSNS, ROC, LR, LOA, specification or other requirements documents.

(2) Send copy of system specification.

b. Highway.

(1) State if item is self-propelled, towed, or transported by truck or semitrailer.

(2) Give model numbers or required transporter(s) (e.g., M818/M172A1, M911/M747, M985).

c. Rail.

(1) State if item will require rail transport in CONUS and/or overseas areas.

(2) State foreign country where rail transport is required.

d. Ocean and waterways.

(1) State if item will be shipped overseas in volume (unit)movements.

(2) State if on-deck storage is permissible.

(3) State type(s) of ship(s) (i.e., Breakbulk, Container, Roll-on/Roll-off, LASH, SEABEE) required.

e. Lighterage. State if item is used in logistics-over-the-shore (LOTS) environment.

f. Intermodal containers. List the size (i.e., 10, 20, 24, 30, 35, 40, or 45 ft) or the ANSI/ISO designation of containers in which transport is required.

g. Helicopters.

(1) Specify the model number(s) of cargo helicopter(s) required.

(2) State if internal and/or external airlift is required. (Current Army utility/cargo helicopters are the UH-1, UH-60, and CH-47.) (Current Marine Corps helicopters are CH-46 and CH-53.)

(3) Give the helicopter mission requirements (time and distance of mission, atmospheric condition requirements, 95°F, 4000 ft, 59°F at sea level, and so forth).

h. Fixed wing aircraft.

State the type(s) of aircraft transport required. (Current Air Force aircraft are C-130, C-141, and C-5.) (Current Civil Reserve Air Fleet are B-707, B-747, DC-8, and DC-10.)

4. *Specialized service and equipment.* State if special rail cars, highway vehicles, or materiel handling equipment are required.

5. *Quantity.* Planned procurement quantity by fiscal year.

6. *Shock and vibration.* Specify the fragility, shock, and vibration considerations required.

7. *Environmental requirements.* Indicate any special environmental considerations required (for example, temperature, pressure, humidity, or power sources).

8. *Hazardous materials.* State any hazardous characteristics (for example, venting, grounding, net explosive weight, and so forth).

9. *Regulatory requirements.* Submit statement of compliance with

Federal regulatory requirements (Title 49, Code of Federal Regulations).

10. *Sectionalization.* If the item can be sectionalized, folded, or reduced for transport, provide the following for each component or subassembly:

a. Time required to disassemble at departure site and reassemble at destination (work hours and clock hours).

b. Special equipment or tools required for sectionalization (for example, cranes, forklifts, wrecker trucks, pallets, nitrogen, calibration equipment, or fixtures).

11. *Manufacture location.* Give the place of manufacture. (If the end item is manufactured at one location and shipped to another for further assembly, give all locations).

12. *Special materials handling equipment (MHE).* Describe any specialized MHE required to support movement (for example, spreader bars or slings).

13. *Transportability tests.* Submit copy of test report and note type of test, test site, and date (test plan and scheduled date if not completed).

14. *Speed requirements.* State self-propelled or towed speed requirements.

15. *Shipping data.* Submit paper copy of shipping data plate that will be secured to vehicle.

16. *Configuration.* (Wheeled, tracked, or skid mounted).

Note. Requirements of paragraphs 16a, b, and c can be met by invoking the following data item description (DID) in contracts:

DI-E-7025 NDI contracts DI-L-3327 RDTE contracts

a. Wheeled vehicles. Two sets of data must be submitted: one for the fully operational configuration (includes fuel, lubricants, water, and so forth) and one for the shipping, reduced, or sectionalized configuration.

(1) Submit an engineering drawing with plan, side, and end views. Dimensions for length, width, height, and location of center of gravity in all three directions are required (fig B-1).

Note. This requirement can be met by submitting a transportability clearance diagram (DI-L-1414).

(2) State the weight (operational empty, operational loaded, shipping empty, and shipping loaded).

(3) Give the number, location and strength (yield and ultimate) of lifting and tiedown provisions for the item and major components removed for transport.

(4) State the dimensions and locations of any significant projections.

(5) Give the number, size(s), locations, and inflation pressures of tires.

(6) Specify the axle loads for each axle (for both empty and loaded vehicles).

(7) Give the locations and dimensions of all tire footprint areas actually in contact with the ground (fig B-2).

(8) Give the angle (in degrees) connecting the horizontal surfaces that the vehicle can pass (crest) without interference (fig B-3).

(9) State the tracking width of each axle (fig B-4).

(10) Specify the wall-to-wall and curb-to-curb turning diameter.

(11) Give military load classification number (for military bridges), empty and loaded. (See FM 5-36.)

b. Tracked vehicles. Two sets of data must be submitted: one for the fully operational configuration (includes fuel, lubricants, water, and so forth) and one for the shipping, reduced, or sectionalized configuration.

(1) Submit an engineering drawing with plan, side, and end views. Dimensions for length, width, height, and location of center of gravity in all three directions are required (fig B-5).

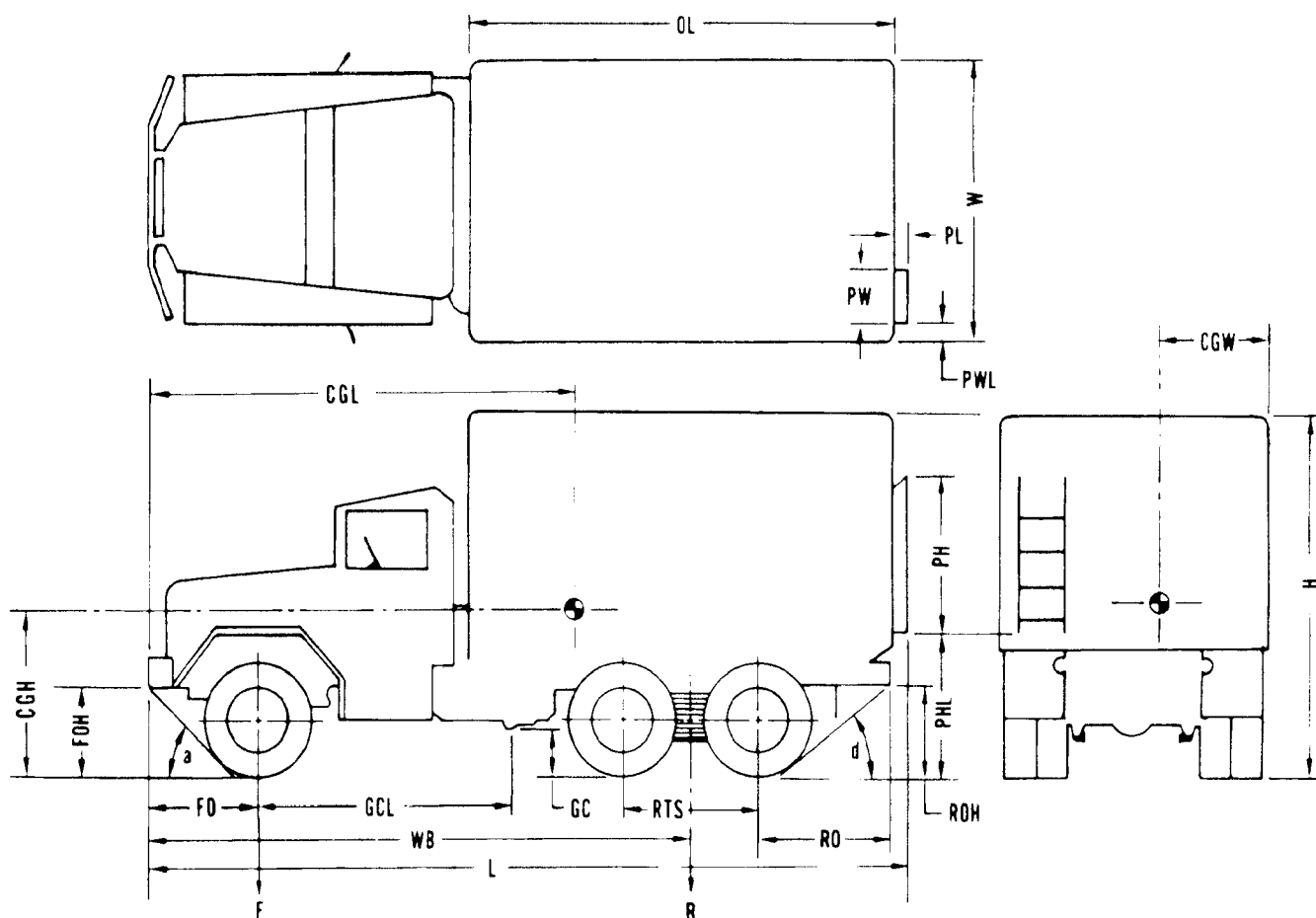
Note. A transportability clearance diagram prepared according to data item description DI-L-1414 may be used to meet this requirement.

- (2) State the weight (shipping and combat loaded).
 - (3) Give the number, location, and strength (yield and ultimate) of lifting and tiedown provisions for the item and major components removed for transport.
 - (4) State the dimensions and locations of any significant projections (for example, antennas and gun tubes).
 - (5) Give the area and number of track shoe pads actually in contact with the ground (fig B-6).
 - (6) State the ground pressure (pounds per square inch).
 - (7) State the military load classification number. (For military bridges, see FM 5-36.)
- c. Skid mounted equipment.* Two sets of data must be submitted: one for the operational configuration (includes fuel, lubricants, water, and so forth) and one for the shipping configuration.

- (1) Submit an engineering drawing with plan, side, and end views. Dimensions for length, width, height, and location of center of gravity in all three directions are required (fig B-7).

Note. A transportability clearance diagram prepared in accordance with data item description DI-L-1414 may be used to meet this requirement.

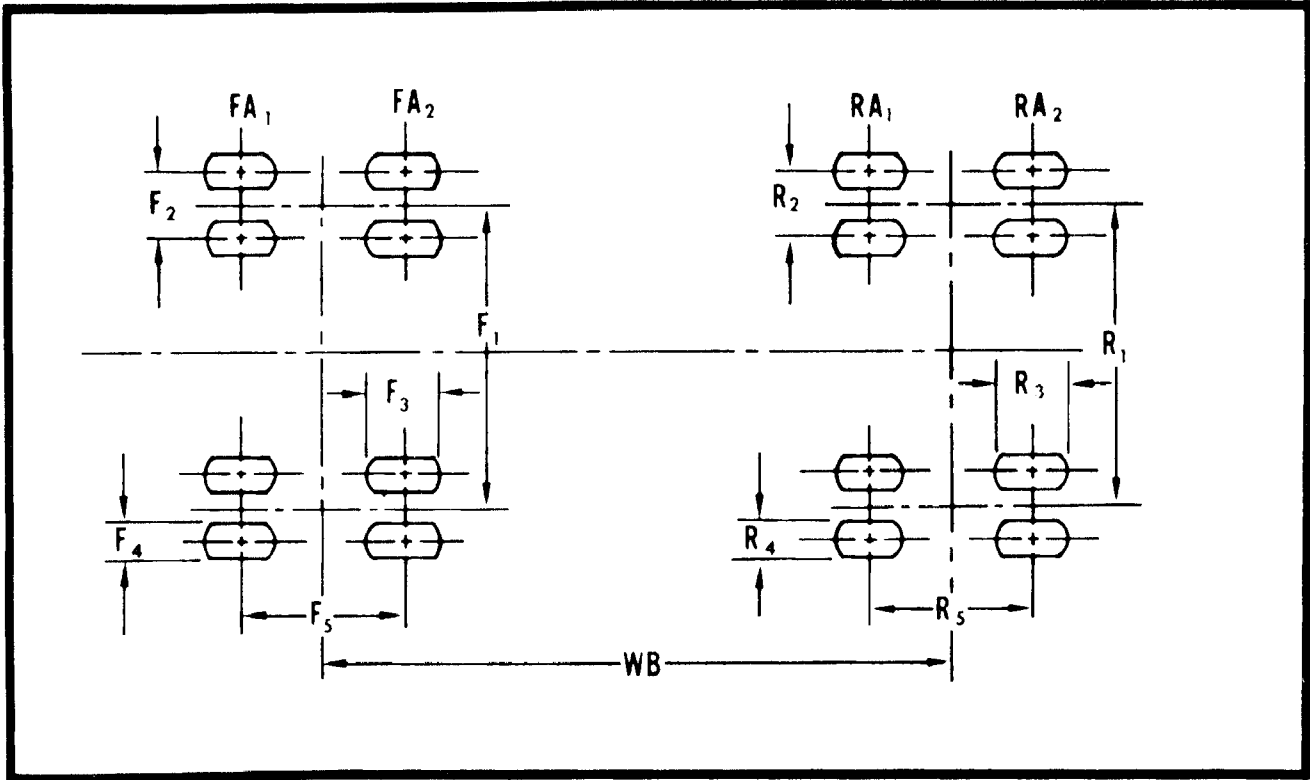
- (2) State the weight (shipping and operational). Operational weight includes fuel, lubricants, water, and so forth.
- (3) Give the number, location, and strength (yield and ultimate) of lifting and tiedown provisions for the item and major components removed for transport.
- (4) State the dimensions and locations of any significant projections.
- (5) Specify the number of skids.
- (6) State the dimensions of all skid areas actually in contact with the ground.



LEGEND

OL - overall length body	WB - wheel base
W - overall width	FO - front overhang
PW - projection width	FOH - front overhang height
PWL - projection width location	RO - rear overhang
PH - projection height	ROH - rear overhang height
PHL - projection height location	GC - ground clearance
PL - projection length	GCL - ground clearance location
H - overall height	RTS - rear tire separation
L - overall length	a - angle of approach
CGL - center of gravity length	d - angle of departure
CGW - center of gravity width	F - front axle load
CGH - center of gravity height	R - rear tandem load

Figure B-1. Wheeled vehicle dimensions



LEGEND

FA - front axle

RA - rear axle

WB _____

F1 _____

F2 _____

F3 _____

F4 _____

F5 _____

R1 _____

R2 _____

R3 _____

R4 _____

R5 _____

Figure B-2. Tire footprint locations and dimensions

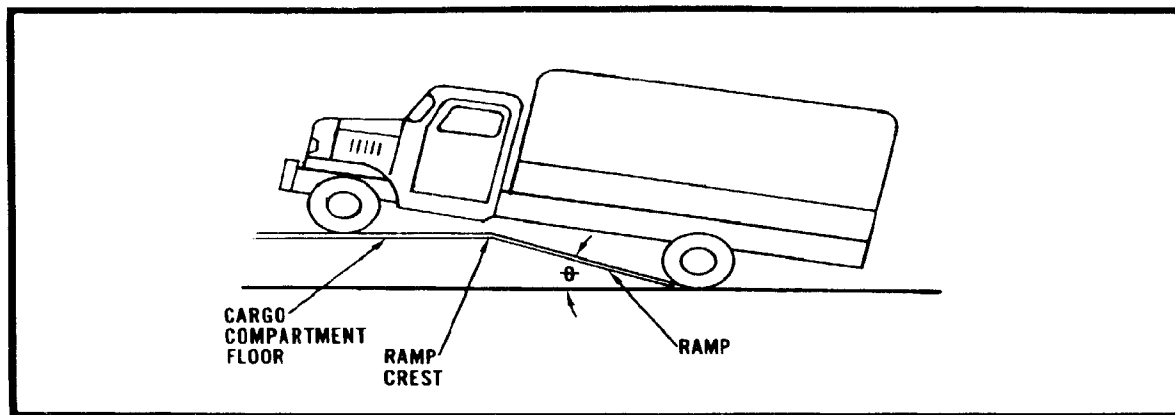


Figure B-3. Ramp crest angle

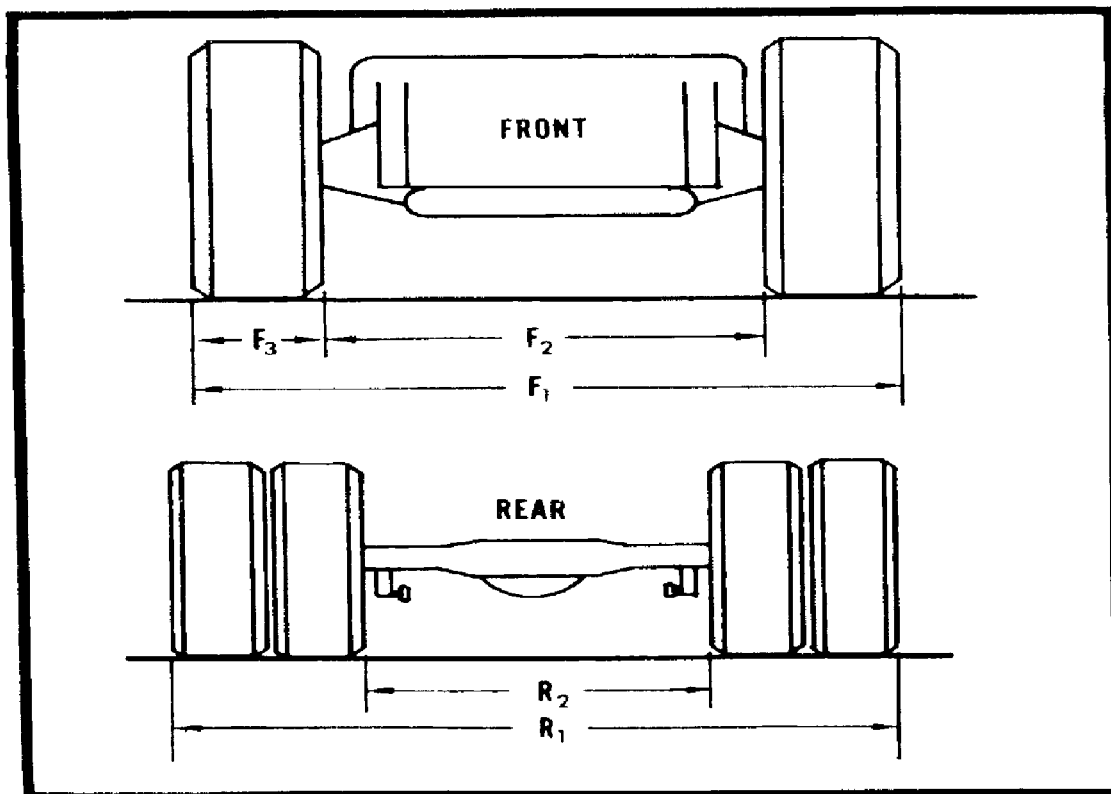
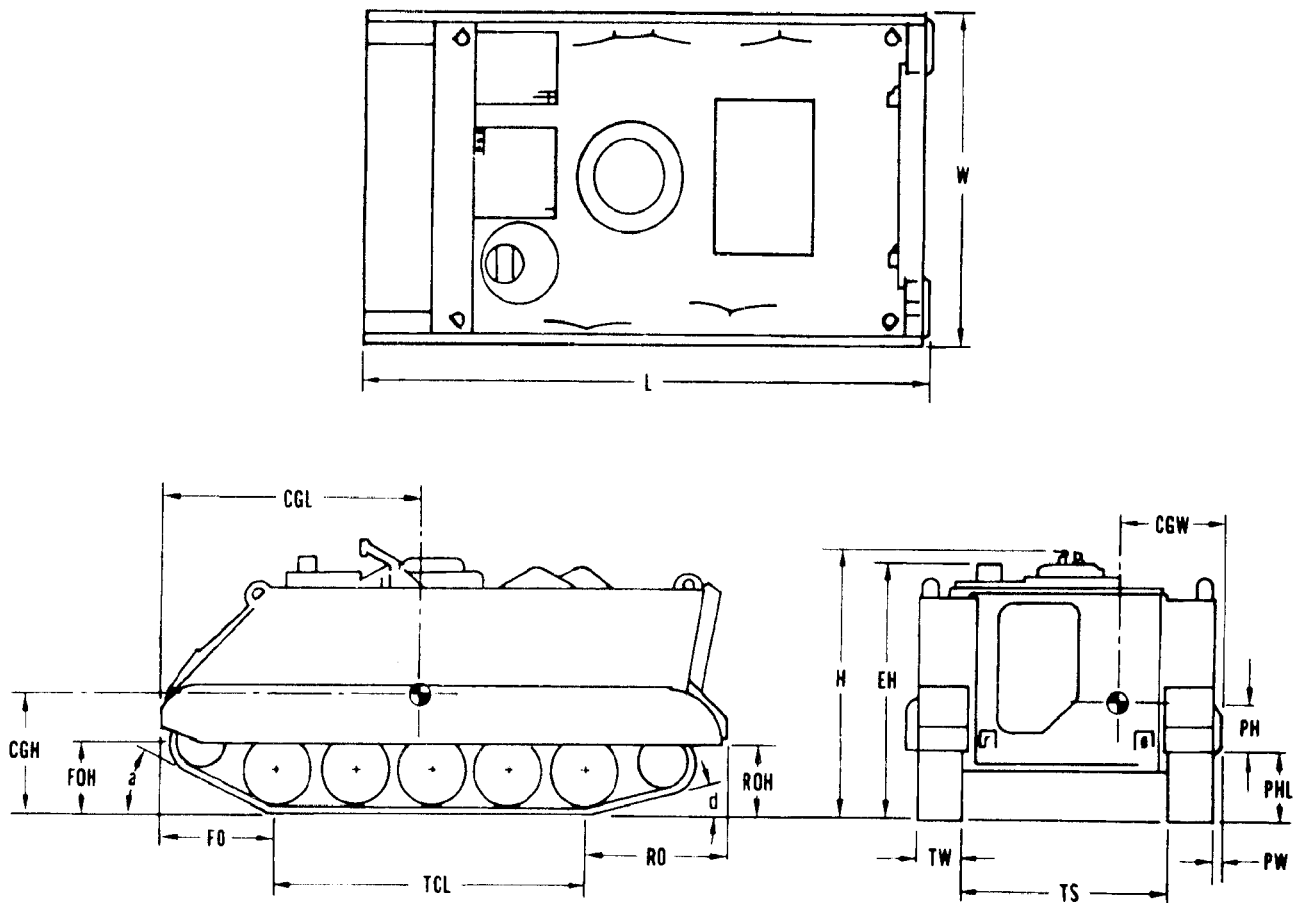


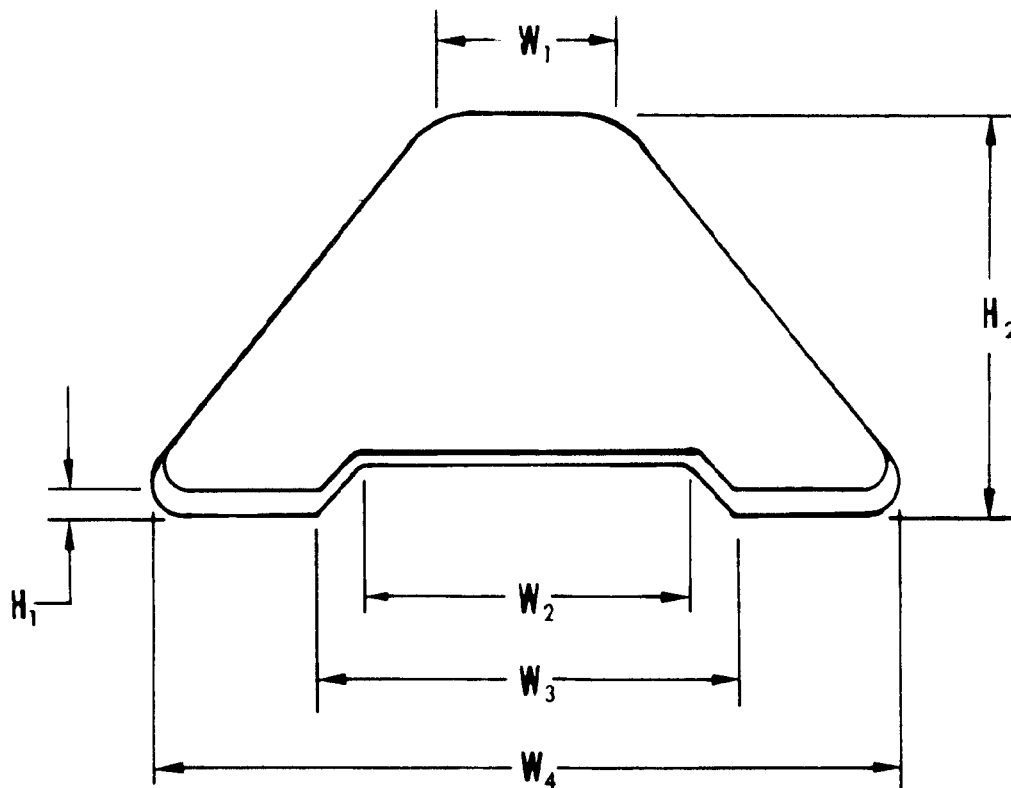
Figure B-4. Tracking width



LEGEND

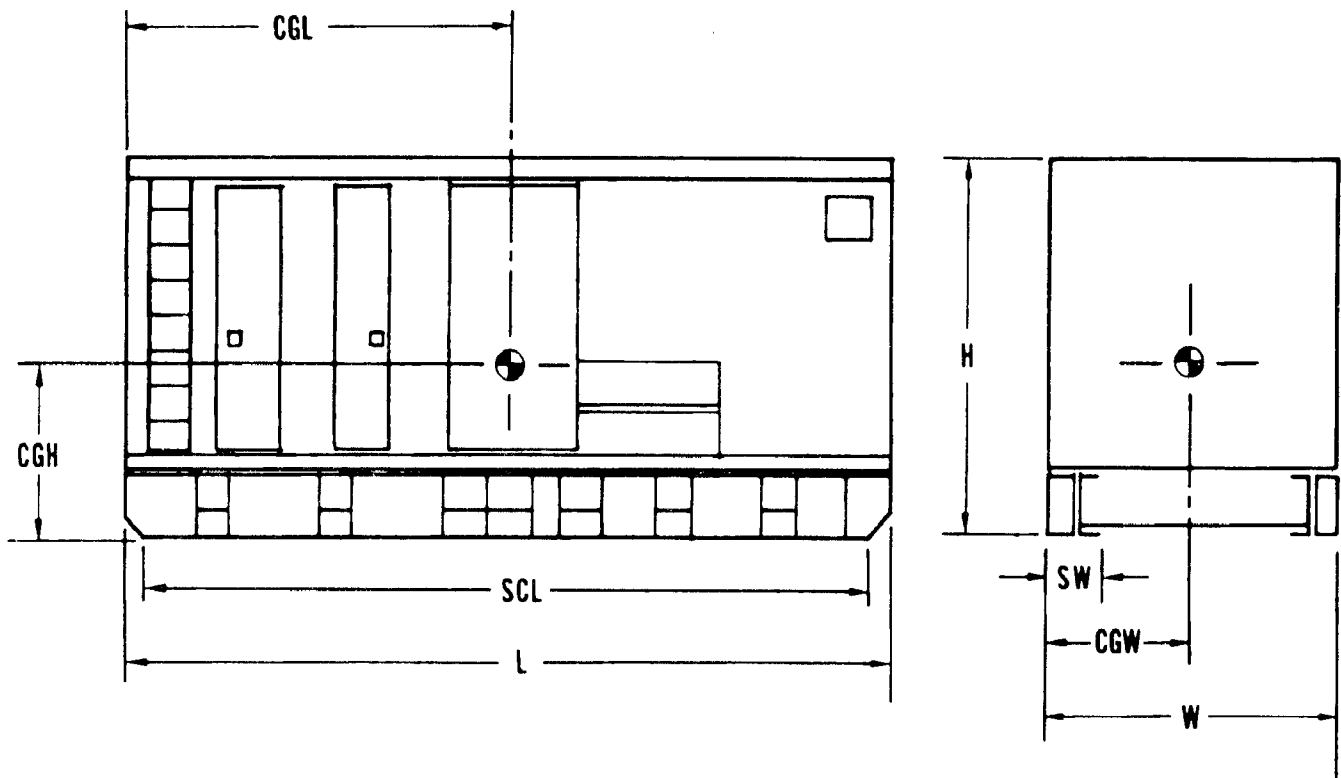
H - overall height	ROH - rear overhang height
W - overall width	TW - track width
L - overall length	PH - projection height
CGL - center of gravity length	PW - projection width
CGW - center of gravity width	PHL - projection height location
CGH - center of gravity height	TS - track separation
TCL - track center line	EH - edge height
FO - front overhang	a - angle of approach
RO - rear overhang	d - angle of departure
FOH - front overhang height	

Figure B-5. Tracked vehicle dimensions



TRACK SHOE PAD

Figure B-6. Track shoe pad dimensions (footprint data)



LEGEND

SCL - skid chamber length	H - overall height
SW - skid width	CGL - center of gravity length
L - overall length	CGW - center of gravity width
W - overall width	CGH - center of gravity height

Figure B-7. Skid mounted item dimensions

Appendix C

Checklist of Transportability Actions

1.	Determine the required interface of the system with the anticipated transportation system.	Combat Developer
2.	Assess design risk in transportability in the LOA; include a milestone for Transportability Approval.	Materiel Developer
3.	Identify actual or potential transportation problems in the ILSP.	Materiel Developer
4.	List essential transportability requirements in the ROC/LR.	Combat Developer
5.	Submit initial transportability report to MTMCTEA prior to IPR/ASARC I.	Combat and/or Materiel Developer
6.	Submit TBOIP data for selected systems to MTMCTEA for unit deployability assessment.	Combat Developer
7.	Include results of MTMCTEA's initial transportability assessment in ILSP.	Materiel Developer
8.	Coordinate DT II Test Design Plan with MTMCTEA.	Materiel Developer
9.	File for transportability approval from MTMC before IPR/ASARC II.	Materiel Developer
10.	Identify transportability DIDs in the Contract Statement of Work.	Materiel Developer
11.	Determine requirement for TGTM with MTMCTEA.	Materiel Developer/Combat Developer
12.	Prepare TGTM.	Materiel Developer/MTMCTEA
13.	Submit DT II test reports and independent evaluations to MTMCTEA.	Materiel Developer
14.	Request transportability verification by MTMC before prior to IPR/ASARC II.	Materiel Developer
15.	Submit end-item transportability characteristic to MTMCTEA for DA master file for TOE equipment.	Materiel Developer
16.	Submit to MTMCTEA for supplemental review PIP modifications that alter item configuration.	Materiel Developer

Glossary

Section I Abbreviations

AAR

Association of American Railroads

AMC

Army Materiel Command

ASARC

Army Systems Acquisition Review Council

ATTLA

Air Transportability Test Loading Agency

BOIP

Basis of issue plan

CBTDEV

combat developer

CG

Commanding General

CONUS

continental United States

CRAF

Civil Reserve Air Fleet

DA

Department of the Army

DCSLOG

Deputy Chief of Staff for Logistics

DID

data item description

DOD

Department of Defense

EAT

external air transport

HVAD

High velocity airdrop

IAT

internal air transport

ILS

integrated logistic support

ILSP

Integrated Logistic Support Plan

IPR

in-process review

ISO

International Standards Organization

JMSNS

Justification for Major System New Start
(formerly MENS)

JSOR

Joint Services Operational Requirement

LAPE

low altitude parachute extraction

LIN

line item number

LOA

Letter of Agreement

LOTS

logistics-over-the-shore

LR

Letter Requirement

LSAR

Logistics Support Analysis Record

LVAD

Low velocity airdrop

MAC

Military Airlift Command

MATDEV

materiel developer

MTMC

Military Traffic Management Command

MTMCTEA

Military Traffic Management Command
Transportation Engineering Agency

NDI

nondevelopmental item

O&O

operational and organizational

PIP

product improvement program

RDTE

research, development, test, and evaluation

ROC

required operational capability

SAAM

special assignment airlift mission

SEM

systems, equipment and munitions

TBOIP

temporary basis of issue plan

TECOM

Test and Evaluation Command

TEMP

test and evaluation master plan

TGTM

transportability guidance technical manual

TOE

table of organization and equipment

TRADOC

U.S. Army Training and Doctrine Command

USALEA

U.S. Army Logistics Evaluation Agency

USANRDC

U.S. Army Natick Research and Development Center

Section II Terms

Airdrop certification

Airdrop certification is an official statement issued by the U.S. Army Natick Research and Development Center that an SEM item may be airdropped from fixed wing aircraft.

Airlift certification

Airlift certification is an official statement by the U.S. Air Force Air Transportability Test Loading Agency (ATTLA) that an item of SEM is transportable in Military Airlift Command prime mission cargo aircraft and Civil Reserve Aircraft Fleet (CRAF) aircraft. Items less than 89 by 104 by 72 inches in width, length, and height and/or 5000 pounds in weight are not included in the certification process.

Fragile Item

An item of systems/equipment/munitions that is susceptible to damage and loss of serviceability during transport and handling, and requires special shipping procedures or equipment, environmental control, or special packaging for protection during transport. Determination of fragility should be accomplished by—

a. Test data that establish the maximum vibration or shock energy permitted to reach the item during transportation and handling.

b. Criteria of MIL-STD-2073, table I, will be used to approximate the fragility G factor when fragility factors have not been established.

Hazardous material

A substance or material that has been determined and designated by the Secretary of Transportation and/or the services to be capable of posing an unreasonable risk to health, safety, and property when transported. Included are explosives, articles such as flammable liquids and solids, and other dangerous oxidizing materials, corrosive materials, compressed gasses, poisons and irritating materials, etiologic agents, and radioactive materials. (See provisions of Title 49 of the U.S. Code and AFR 71-4/TM 38-250/NAV-SUP PUB 505(REV)/MCO P4030.19D/DSAM 4145.3.)

Helicopter certification

Helicopter certification is an official statement issued by the U.S. Army Natick Research and Development Center that an item of SEM is internally/externally transportable by U.S. Army rotary winged aircraft.

Lighter

A barge used chiefly to load or unload larger ships wherever shallow water prevents them from coming into the shore.

Systems Equipment Munitions (SEM) Materiel

All items and item components necessary for the equipment, maintenance, operation, and support of military activities without distinction as to their application for administrative or combat purposes, excluding ships.

Transportability

The capability of materiel and units to be efficiently moved by towing, by self-propulsion, or by carrier via railways, highways, waterways, pipelines, oceans, and airways using existing modal or intermodal transport equipment.

Transportability approval

A statement by MTMC, the Army transportability agent, that an item of materiel, in its shipping configurations, is transportable by the required mode(s) of transportation.

Transportability assessment

Initial assessment of an item's ability to meet deployment requirements. The evaluation is based on the item's projected dimensions, operational capabilities and fielding requirements.

Transportability characteristics data

Basic transportability data on all items of TOE are maintained in the DA Standard Transportability Data file. It includes dimensions and weight of each item of SEM in the various shipping configurations, together with the item nomenclature and identification (LIN number and NSN) and information on item characteristics that influence the transporting of the item (e.g., location and strength of tiedown and lifting provisions, location of center of gravity, wheel and track loads and pressure, and cargo bed dimensions).

Transportability criteria

The physical characteristics of the individual modes of transportation together with legal and administrative requirements that must be considered in the design of SEM items to assure efficient movement by existing and proposed transportation systems.

Transportability engineering

The process of identifying and measuring limiting constraints, characteristics, and environments of transportation systems; the integration of these data into design criteria to use operational and planned transportation capability effectively; and the development of technical transportability guidance.

Transportability engineering analysis

An evaluation of the transportability of an SEM item and its components, auxiliary and

ancillary equipment. An analysis will summarize its ability to be transported by the required modes of transportation.

Transportability guidance

Published information needed during loading, securing, moving, unloading, and handling operations to assure safe and effective logistics transportation of an item of military equipment (or component thereof) via railways, highways, waterways, oceans, airways, and off road as cargo, towed, or self-propulsion. It includes technical and physical characteristics, loading, blocking, bracing, tiedown, anchoring, validated dimensions, sectionalization, center of gravity, distribution of load, shipping cube for both operational and sectionalized configurations, transportation regulations, special procedures, and permits for movement.

Transportability problem item

Equipment in its shipping configuration which, because of its size, weight, fragile or hazardous characteristics, or lack of adequate means for lifting and tiedown will be denied movement, will require special permits or waivers and special equipment or handling, or will be unacceptably delayed when moving within existing or newly designed transportation systems (AR 70-44, app.A, para A-9). SEMs are considered a problem item when any of the following conditions apply:

- a. Item is wheeled or tracked, or is to be towed, hauled, or self-propelled off highway or on highway.
- b. Materiel exceeds any of the following conditions:
 - (1) Length—18.5 feet (5.639 m).
 - (2) Width—7 feet (2.134 m).
 - (3) Height—6.5 feet (1.981 m).
 - (4) Weight—2500 pounds (1134 kg).
 - (5) Weight per linear foot—1,600 pounds (726 kg).
 - (6) Floor contact pressure—50 PSI (344.75 kpa).

Transportability report

A report submitted by the material developer or field unit on transportability problem items. All information necessary for a comprehensive transportability engineering analysis will be included.

Unit deployment analysis

The final evaluation of the amount of strategic lift consumed by units receiving a transportability problem item system.

Unit deployment assessment

Initial assessment of a unit's ability to be deployed in terms of strategic lift consumed. The assessment is based on the projected dimensions of the proposed systems with associated items of equipment.

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